HANDY COMMUNICATION TERMINAL AND METHOD OF SCROLLING DISPLAY SCREEN OF THE SAME

BACKGROUND OF THE INVENTION

1. Field of the Invention

The invention relates to a handy terminal such as PDA, a hand-held computer and an E-mail viewer, and a method of controlling display in a display screen.

2. Description of the Related Art

A handy terminal such as PDA, a hand-held computer and an E-mail viewer is advantageous in that it can be handled with one hand.

A conventional handy terminal is usually designed to have a shift key such as a cross-shaped key. An area for displaying document data in a display screen may be scrolled by means of such a shift key, and a cursor may be moved in vertical and horizontal directions. When an operator scrolls such a display area or moves a cursor in a desired direction, an operator usually holds a handy terminal with one hand, and makes display area scrolling operation or cursor moving operation with the other hand.

However, since a display screen of a handy terminal is quite small in size, it is necessary to often scroll data displayed in a display screen, when document such as E-mail is to be viewed.

In addition, since a display area in a display screen is scrolled and a cursor is moved in a display screen both by means of a shift key, an operator has to hold a handy terminal with one hand, and operate a shift key with the other hand. As a result, an operator cannot do anything with his or her hands while he or she is operating a handy terminal.

Japanese Unexamined Patent Publication No. 5-197489 has suggested an X-Y coordinate input device detecting a direction in which a ball is rotated and an angle by which a ball is rotated. The X-Y coordinate input device is applied to a display device such as CRT, for instance.

Japanese Unexamined Patent Publication No. 6-149462 has suggested a data processing apparatus and an input control apparatus accomplishing click input operation equivalent to button-click of a mouse or pen-click, when an input panel is to be operated by means of a pen having no physical switch.

Japanese Unexamined Patent Publication No. 9-508729, based on the international patent application PCT/US95/00806 to which U.S. patent application Ser. No. 08/189,974 is assigned, has suggested a handy electronic pencil. The handy electronic pencil is comprised of a top point with which an operator writes on a screen, and a pressure sensor equipped in the top point and transmitting a signal when the top point makes contact with the screen.

SUMMARY OF THE INVENTION

It is an object of the present invention to provide a handy terminal which makes it possible for an operator to scroll a display area in a display screen and move a cursor in a display screen with one hand.

In one aspect, there is provided a handy terminal including (a) a body, (b) a central processing unit housed in the body, (c) a display screen equipped at a surface of the body, displaying therein data instructed by the central processing unit, (d) a display controller controlling an operation of the display screen in accordance with a display control signal transmitted from the central processing unit, and (e) an inclination detector detecting a direction in which the body is inclined and an inclination angle by which the body is inclined, and transmitting an inclination-indicating signal indicative of the thus detected inclination direction and angle of the body to the central processing unit, the central processing unit transmitting a display control signal indicative of the thus detected inclination direction and angle of the body to the display controller, the display controller scrolling the data displayed in the display screen in accordance with the display control signal.

It is preferable that the handy terminal further includes (f) one of an antenna making radio communication therethrough and an interface making wire communication, (g) a transceiver modulating data to be transmitted and demodulating received data, and (h) a communication controller controlling communication protocol.

For instance, the display controller may be designed to scroll the data displayed in the display screen in a direction in which the body is inclined.

It is preferable that the central processing unit transmits the display control signal only when the inclination angle of the body is equal to or greater than a threshold angle.

For instance, the inclination detector may be designed to detect inclination angle of the body in at least one of X- and Y-axes direction(s).

For instance, the inclination detector may be designed to detect inclination of the body in all directions, in which case, the central processing unit transmits a display control signal indicative of a single direction resulting from synthesizing the thus detected all inclination directions of the body, to the display controller.

It is preferable that the central processing unit causes the display controller to keep the data displayed in the display screen for a predetermined period of time after the display controller have scrolled the data in the display screen.

There is further provided a handy terminal including (a) a body, (b) a central processing unit housed in the body, (c) a display screen equipped at a surface of the body, displaying therein data instructed by the central processing unit, (d) a display controller controlling an operation of the display screen in accordance with a display control signal transmitted from the central processing unit, (e) an inclination detector detecting a direction in which the body is inclined and an inclination angle by which the body is inclined, and transmitting an inclination-indicating signal indicative of the thus detected inclination direction and angle of the body to the central processing unit, and (f) an on-off switch equipped with the body and operated by an operator, the inclination detector establishing an initial angle which is an inclination angle of the body to be made when the on-off switch is turned on, and detecting an inclination angle of the body on the basis of the thus established initial angle, the central processing unit transmitting a display control signal indicative of the thus detected inclination direction and angle of the body to the display controller, the display controller scrolling the data displayed in the display screen in accordance with the display control signal.

There is still further provided a handy terminal including (a) a body, (b) a central processing unit housed in the body, (c) a display screen equipped at a surface of the body, displaying therein data instructed by the central processing unit, (d) a display controller controlling an operation of the display screen in accordance with a display control signal transmitted from the central processing unit, (e) an inclina-